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DRAFT TECHNICAL MEMORANDUM

To: Todd Slater, LSS
From: Les Williams, Damian Preziosi, David Livermore
Date: August 12, 2010
Subject: Baseline Salmonid Habitat Survey, Arkema Facility, Portland OR
Project No.: C721

INTRODUCTION

This technical memorandum presents the results of baseline salmon habitat evaluation performed by Integral Consulting Inc. (Integral) on behalf of Legacy Site Services, LLC (LSS) in support of ongoing riverbank source control measures (SCM) studies being performed at the Arkema Site.

In 2009, ERM provided to DEQ a draft conceptual summary of potential remedial alternatives in anticipation of future SCMs if warranted for soils along portions of the riverbank at the Site. DEQ (2010) reviewed the conceptual summary and conveyed the possible need to address potential impacts of riverbank SCMs potential habitat for salmon along the shoreline adjacent to riverbank soils and the potential mitigation efforts that may be required to address those impacts. As part of a riverbank alternatives evaluation for SCMs, DEQ requested that LSS address 1) the degree that each alternative might contribute to short- and long-term impacts to shoreline salmon habitat; 2) the type and degree of mitigation that may be required to address these impacts (with a preference for onsite mitigation); and 3) the costs associated with the mitigation approaches.

Subsequent to DEQ's (2010) comments, the Natural Resources Trustee Council for Portland Harbor published a summary of an expert panel review of restoration of Chinook salmon habitat with a companion table of relative ranking values that could be used to assess differences between baseline conditions and altered conditions associated

with remedial activities. The National Marine Fisheries Service (NMFS 2010) working with the Lower Willamette Group (LWG) has subsequently modified the relative ranking values in development of a Programmatic Biological Assessment for the lower Willamette River and application to site-specific ESA consultations where remedial activities may affect salmonids (Appendix 1). Discussions between NMFS and the LWG regarding the ranking values and their application are ongoing.

DEQ has requested that LSS use the NMFS' ranking values in the LSS assessment of baseline habitat conditions for salmonids in the vicinity of the Arkema Site. This technical memorandum provides an overview of the approach that was used to accommodate the most recent iteration¹ of the NMFS habitat values. Results of the baseline habitat assessment are presented and discussed in the context of the draft conceptual summary of remedial alternatives presented previously by ERM (2009). Given that ERM's (2009) summary of source control measures was entirely conceptual, comparison with specific remedial alternatives or combinations thereof are not possible at this time, but will be completed as part of the feasibility study for riverbank source control measures. Nevertheless, for this evaluation, the kinds of remedial alternatives contemplated by ERM (2009), if appropriate, can be expressed conceptually in terms of net environmental gains or losses of salmonid habitat that may be anticipated in a more rigorous engineering evaluation.

APPROACH

This evaluation consisted of the following four-step approach to identifying potential salmon habitat impacts associated with conceptual SCMs envisioned for the Site:

Step 1 – NMFS Salmon Habitat Categories. A review of NMFS relative ranking values for salmon habitat categories performed in order to understand the relevance and context of potential salmon habitat present immediately adjacent to the riverbank along the Site. NMFS identified four main salmon habitat categories of relevance to the Site.

Step 2 – Baseline Habitat Survey. Integral performed a site walk to document baseline habitat conditions along the riverbank at the Site. While a variety of site characterization has previously been performed to document the physical setting and general habitat types present at the Site, the site walk was performed to

¹ Estimates of relative habitat value herein are interim and subject to change pursuant to future revisions or amendments by NMFS in consultation with the LWG.

identify habitat types specifically along the riverbank of relevance to the four main salmon habitat categories identified by NMFS.

Step 3 – Mapping of Conceptual SCMs. Based on the conceptual SCM summary prepared by ERM (2009), four areas have been identified for potential source control activities along the riverbank. The nature of the SCM activities within these areas was reviewed, and the locations of potential SCMs were mapped. It is emphasized that the SCM summary (ERM 2009) is conceptual and preliminary in nature. Identification of areas potentially requiring SCM's and the types of SCMs which, if appropriate, may be implemented have not been agreed upon between LSS and DEQ. The Riverbank Feasibility Study, which is under development, will further identify/clarify these issues.

Step 4 - Relative Habitat Valuation. For each conceptual SCM area, the number of acres within each the habitat categories was determined from site observations and GIS mapping. The relative ranking values were then multiplied by the habitat area to derive a habitat value (expressed as Acres × Relative Ranking Value).

The remainder of this technical memorandum provides additional details of the four-step approach and presents a discussion of the findings of this evaluation.

NMFS Habitat Categories

As described, the most recent iteration of the NMFS relative ranking values were utilized in this assessment of baseline conditions of salmonid habitat in the vicinity of the Arkema Site. NMFS (2010) identifies four salmonid habitats, each with a number of characteristics and assigned relative ranking values (Appendix 1). NMFS defines these four habitats as follows:

1. Riparian habitat – The area within 400 ft of ordinary high water (OHW), which may be comprised of the following features or combination of features: naturally vegetated² forest or grass/shrub land; vegetated riprap; or areas that are unvegetated, paved, buildings and riprap. Relative habitat values for naturally vegetated forest or grass/shrub land may be modified if they occur within the historic floodplain or if invasive species are present within the plant community. Habitat values assigned to plant communities vary from the maximum value assigned for an area comprised entirely of natural (i.e., native) vegetation to a

² NMFS (2010) defines naturally vegetated to mean vegetated by native species.

minimum value of 0.1 depending on the extent of invasive species within an area.

2. Active Channel Margin – The area between OHW and ordinary low water (OLW), which may be comprised of the following features or combination of features: unarmored slopes with and without vegetation, bio-engineered slopes, riprap, sheetpile, piling, covered structures. Different values are assigned depending on the steepness of the slopes (<5:1 or >5:1). Areas with pilings are assigned a value of one-half of the metric that would be used in the absence of pilings.
3. Main Channel –Three areas are defined: shallow from 0 to 10 ft below OLW, shallow water from 10-20 ft below OLW, and deepwater >20 ft below OLW. Relative habitat values are assigned based on the composition of the substratum within each area, the presence of covered structures, and pilings. Areas with pilings, are assigned a value of one-half of the metric that would be used in the absence of pilings.
4. Off Channel - Off-channel habitats are those bodies of water adjacent to the main channel that have surface water connections to the main river channel at summer discharge levels, including tributaries, side channels, alcoves, sloughs, and embayments (Landers et al. 2002).

Baseline Habitat Survey

The Arkema Site is an industrial property located in the heavily industrialized area of Portland Harbor. The physical features of the site, including the areas along the riverbank, are defined by the industrial use of the site during former plant operations.

For this assessment, the site was characterized using a Geographic Information System (GIS) to integrate known features of the site with a site-survey designed to observe specific habitat features potentially relevant to the NMFS (2010) habitat classifications described above.

High resolution, orthographically corrected images from August 2009 were obtained from the City of Portland to create a base map of the site and to define the boundaries for each of the four salmonid habitats. These images were combined in GIS with topographic and bathymetric data to further resolve the site based on slopes with the active channel margin, depths of water to the site boundary, and presence/absence of vegetation within the site boundaries. Site locations where source control measures have been described (ERM 2009) were then integrated with the habitat features to

integrate habitats with particular areas where remedial alternatives have been contemplated.

A site survey was conducted on July 6, 2010 to ground truth information available from aerial imagery and GIS and to document conditions within the exposed portion of the active channel margin and adjacent riparian habitat. The site walk proceeded from upstream to downstream with systematic observations taken every 50 ft of the plant community; soil, debris, fill material present; covered structures; pilings; and coarse woody material. A total of 67 locations were visited. Each location visited was systematically photographed to provide images showing upstream, downstream and upbank views of the active channel margin and adjacent riparian habitat. The images were further categorized to define the presence of invasive plant species in the riparian zone, and the presence of armoring and vegetation within the active channel margin.

MAPPING OF CONCEPTUAL SCM AREAS

Figure 1 shows the various NMFS defined habitat boundaries and associated acreages within each of the four conceptual SCM areas for the site. Proceeding from upstream to downstream, the four SCMs are:

1. The Salt Pad Area
2. Dock 1 and Dock 2
3. Lot 3
4. Lot 1 and Lot 2.

Areas generated from the GIS overlays for the relevant habitat features within each of the SCM areas are summarized in Table 1. A detailed list of the site survey results for each station and SCM area is provided as Appendix 2. A list of plants tentatively identified during the site walk is provided in Table 2.

Overall the riverbank is heavily industrial in nature and is dominated by structures associated with the former plant operations. What nominal plant community exists on the sloped riverbank has few native species, and is predominantly comprised of weedy or ruderal invasive species (Table 3). The GIS overlays and site survey information was integrated to derive the relative habitat ranking values for each of the SCM areas as described below.

RELATIVE HABITAT VALUATION

Habitat values were determined for each of the four areas containing conceptual SCMs. To derive a habitat value, each habitat characteristic was first expressed as a percentage of the total number of available acres within each SCM area. This fraction was then multiplied by the total available SCM area to estimate the number of relevant acres for each habitat characteristic. The relative ranking values were then multiplied by the habitat area to derive a habitat value (expressed as Acres \times Relative Ranking Value). The relative habitat valuations are presented separately for each area below.

Salt Pad Area

Results of the habitat evaluation for the Salt Pad Area are presented in Figure 2 and Table 4.

The NMS defined riparian habitat category covers 6.16 acres and has an overall Acres \times Ranking Value of 0.04. This low value is attributed to the industrial nature of the property. The riparian zone is dominated (88%) by unvegetated gravel, pavement, buildings, and riprap and has no value as salmonid habitat. Vegetated riprap accounts for the remainder (12%) of the riparian zone and has limited value as salmonid habitat.

The active channel margin covers 0.8 acres and has overall Acres \times Ranking Value of 0.002. This low value is attributed to the predominance of riprap and covered structures in this area.

Shallow water habitat covers 0.97 acres for the combined 0-10 ft and 10-20 ft zones, with a combined Acres \times Ranking Value of 0.84. This relatively high value is attributed to the dominance of gravel and finer substrates in this area, which are diminished by the presence of covered structures.

The 0.94 acres of deep water habitat is comprised entirely of natural substrates with an associated Acres \times Ranking Value of 0.09.

None of the Salt Pad area is designated as an off-channel area. Although the upstream bank of the Salt Pad Area borders an off-channel cove (Figure 2), the cove outside of the site boundary and is part of the adjacent upstream property.

Dock 1 and Dock 2 Area

Results of the habitat evaluation for the Dock 1 and Dock 2 Area are presented in Figure 3 and Table 5.

The NMS defined riparian habitat category covers 8.41 acres and has an overall Acres × Ranking Value of 0.05. This low value is attributed to the industrial nature of the property. The riparian zone is dominated (89%) by unvegetated gravel, pavement, buildings, and riprap and has no value as salmonid habitat. Vegetated riprap accounts for the remainder (11%) of the riparian zone and has limited value as salmonid habitat.

The active channel margin covers 1.51 acres and has overall Acres × Ranking Value of 0.24. This low value is attributed to the predominance of riprap and covered structures in this area.

Shallow water habitat covers 2.14 acres for the combined 0-10 ft and 10-20 ft zones, with a combined Acres × Ranking Value of 1.64. This relatively moderate value is attributed to the dominance and high value given to gravel and finer substrates, which is diminished by the presence of covered structures which account for 14 to 44% of the shallow water areas.

The 1.52 acres of deep water habitat is comprised entirely of natural substrates with an associated Acres × Ranking Value of 0.15.

There are no off-channel areas within the Dock 1 and Dock 2 SCM area.

Lot 3 Area

Results of the habitat evaluation for the Lot 3 Area are presented in Figure 4 and Table 6.

The NMS defined riparian habitat category covers 5.23 acres and has an overall Acres × Ranking Value of 0.03. This low value is attributed to the industrial nature of the property. The riparian zone is dominated (90%) by unvegetated gravel, pavement, buildings, and riprap and has no value as salmonid habitat. Vegetated riprap accounts for the remainder (10%) of the riparian zone and has limited value as salmonid habitat.

The active channel margin covers 1.83 acres and has overall Acres × Ranking Value of 0.93. This moderate value is attributed to the presence of relative highly valued low-sloped, unarmored and unvegetated habitat in about 63% of the area with remainder comprised of rock riprap.

Shallow water habitat covers 2.38 acres for the combined 0-10 ft and 10-20 ft zones, with a combined Acres × Ranking Value of 2.18. This value is attributed to the dominance and high value given to gravel and finer substrates, which is diminished by the presence concrete, covered structures and pilings which collective account for 5 to 6% of the shallow water areas.

The 0.94 acres of deep water habitat is comprised entirely of natural substrates with an associated Acres × Ranking Value of 0.09.

There are no off-channel areas within the Lot 3 SCM area.

Lot 1 and Lot 2 Area

Results of the habitat evaluation for the Lot 1 and Lot 2 Area are presented in Figure 5 and Table 7.

The NMS defined riparian habitat category covers 8.68 acres and has an overall Acres × Ranking Value of 0.08. This low value is attributed to the industrial nature of the property. The riparian zone is dominated (87%) by unvegetated gravel, pavement, buildings, and riprap and has no value as salmonid habitat. Relatively low valued habitat accounts for the remaining riparian habitat. Vegetated grass/shrub land comprised of mixed native and invasive plant species occupies about 5% and vegetated riprap accounts for about 8% of the riparian area. The vegetated grass/shrub shares a stand of Black Cottonwood trees with the active channel margin.

The active channel margin covers 4.63 acres and has overall Acres × Ranking Value of 3.2. This moderate value is attributed to the presence of relative highly valued low-sloped, unarmored and unvegetated habitat in about 81% of the area with additional components of unarmored vegetated habitat in about 6% of the area. The vegetated portion of the active channel margin is dominated by a stand of Black Cottonwood trees, which are native to the area and are a highly valued ecosystem component. The remainder of the active channel margin is comprised of rock riprap and pilings fields with no habitat value.

Shallow water habitat covers 3.51 acres for the combined 0-10 ft and 10-20 ft zones, with a combined Acres × Ranking Value of 3.11. This value is attributed to the dominance and high value given to gravel and finer substrates, which is diminished by the presence of pilings in about 13% of the 0-10 ft. shallow water area.

The 2.7 acres of deep water habitat is comprised entirely of natural substrates with an associated Acres × Ranking Value of 0.27.

There are no off-channel areas within the Lot 1 and Lot 2 SCM area.

DISCUSSION

Based on the use of the NMFS relative ranking habitat values in this assessment, salmonid habitat quality along the riverbank is extremely limited throughout the entire site. Consequently, virtually any remedial alternative in the riparian zone that adds vegetated grass/shrub land would be an improvement to the existing condition.

The active channel margin has low existing salmonid habitat value in the Salt Pad and Dock 1 and Dock 2 areas due to the dominance of riprap in these areas. Consequently, remedial alternatives that include unarmored or bioengineered slopes could result in improvement to the existing salmonid habitat. However, the proportion of unarmored habitat increases downstream in areas represented by Lot 3, and Lot 1 and Lot 2. In these areas, remedial alternatives may need to be designed in recognition of existing habitat conditions with appropriate consideration of any mitigation or enhancements that may be needed to offset potential salmonid habitat losses and gains.

Baseline salmonid habitat quality in shallow water areas is moderate to high throughout the site. Primary factors that affect shallow water habitat quality are structures (docks) in the Salt Pad and Dock 1 and 2 areas and pilings primarily in the Lot 1 and 2 area. Again, in these areas, remedial alternatives may need to be designed in recognition of existing habitat conditions with appropriate consideration of any mitigation or enhancements that may be needed to offset potential salmonid habitat losses and gains.

Other factors will become important as this process continues from a conceptual evaluation of alternatives to a feasibility study and remedial design with a more focused understanding of SCM alternatives, engineering specifications and their costs. A critical factor in this evaluation will be balancing the net environmental benefits or losses that may accrue against actual costs of remedial alternatives.

REFERENCES

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